

US EPA ARCHIVE DOCUMENT

THE ENVIRONMENTAL TECHNOLOGY VERIFICATION
PROGRAM



ETV Joint Verification Statement

TECHNOLOGY TYPE:	MOBILE DIESEL ENGINE AIR POLLUTION CONTROL
APPLICATION:	CONTROL OF EMISSIONS FROM MOBILE DIESEL ENGINES IN HIGHWAY USE WITH DIESEL FUEL FORMULATION
TECHNOLOGY NAME:	CCD15010 FUEL WITH HITEC4121 ADDITIVE
COMPANY:	FLINT HILLS RESOURCES, LP
ADDRESS:	4111 EAST 37TH STREET NORTH WICHITA, KS 67220
PHONE:	(316) 828-5002
FAX:	(316) 828-4905
WEB SITE:	http://www.fhr.com/
E-MAIL:	Charley.Selvidge@fhr.com

The U.S. Environmental Protection Agency (EPA) has created the Environmental Technology Verification (ETV) Program to facilitate the deployment of innovative or improved environmental technologies through performance verification and dissemination of information. The goal of the ETV Program is to further environmental protection by accelerating the acceptance and use of improved and cost-effective technologies. ETV seeks to achieve this goal by providing high-quality, peer-reviewed data on technology performance to those involved in the design, distribution, financing, permitting, purchase, and use of environmental technologies.

ETV works in partnership with recognized standards and testing organizations; stakeholder groups, which consist of buyers, vendor organizations, permittees, and other interested parties; and with the full participation of individual technology developers. The program evaluates the performance of innovative technologies by developing test plans that are responsive to the needs of stakeholders, conducting field or laboratory tests (as appropriate), collecting and analyzing data, and preparing peer-reviewed reports. All evaluations are conducted in accordance with rigorous quality assurance (QA) protocols to ensure that data of known and adequate quality are generated and that the results are defensible.

The Air Pollution Control Technology Verification Center (APCT Center), one of six centers under the ETV Program, is operated by RTI International (RTI), in cooperation with EPA's National Risk Management Research Laboratory. The APCT Center has evaluated the performance of an emissions control system consisting of a fuel formulation and additive.

ETV TEST DESCRIPTION

All tests were performed in accordance with the *Test/QA Plan for the Verification Testing of Alternative or Reformulated Liquid Fuels, Fuel Additives, Fuel Emulsions, and Lubricants for Highway and Nonroad Use Heavy Duty Diesel Engines and Light Duty Gasoline Engines and Vehicles* and the *Test-Specific Addendum to ETV Mobile Source Test/QA Plan for Flint Hills Resources for the CCD15010 Diesel Fuel Formulation*. These documents are written in accordance with the applicable generic verification protocol and include requirements for quality management, QA, procedures for product selection, auditing of the test laboratories, and test reporting format.

The mobile diesel engine air pollution control fuel formulation was tested October 18-27, 2006, at Southwest Research Institute. The performance verified was the percentage emission reduction achieved by the fuel formulation for particulate matter (PM), nitrogen oxides (NO_x), hydrocarbons (HC), and carbon monoxide (CO) relative to the performance of the same baseline engine with standard ultra-low sulfur diesel (ULSD) fuel. Operating conditions were documented and ancillary performance measurements were also made. A summary description of the ETV test is provided in Table 1.

Table 1. Summary Description of the ETV Test

Test type	Highway Transient Federal Test Procedure (FTP) and Supplemental Emissions Test (SET)
Engine family	MDD12.7FZAK
Engine make–model year	Detroit Diesel Corp (DDC) – 1991 Series 60, 6067GU60
Service class	Highway, heavy-duty diesel engine
Engine rated power	365 bhp @ 1800 rpm
Engine displacement, type	12.7 L, six-cylinder
Technology	CCD15010 with HiTEC4121
Technology description	Diesel fuel formulation with additive
Test cycle or mode description	One cold-start and three hot-start tests plus supplemental emissions tests according to FTP test
Baseline fuel description	Ultra-low-sulfur diesel (ULSD) fuel with 15 ppm sulfur maximum
Critical measurements	PM, NO _x , HC, and CO
Ancillary measurements	Carbon dioxide, exhaust backpressure, and fuel consumption

VERIFIED TECHNOLOGY DESCRIPTION

This verification statement describes the performance of the tested technology, CCD15010 diesel fuel formulation with HiTEC4121 additive, on the diesel engine identified in Table 1.

VERIFICATION OF PERFORMANCE

The *CCD15010 fuel formulation with HiTEC4121 additive* achieved the reduction in tailpipe emissions shown in Table 2 compared to baseline operation without the additive.

Table 2. Verified Emissions Reductions

Technology	Mean Emissions Reduction (%)				95% Confidence Limits on the Emissions Reduction (%)			
	PM	NOx	HC	CO	PM	NOx	HC	CO
CCD15010+HiTEC4121	-0.74 ^a	8.2	17	9.6	- ^b	7.3 to 9.0	- ^b	5.3 to 14

^a Negative reduction indicates increase in emissions.

^b The emissions reduction can not be distinguished from zero with 95% confidence.

The APCT Center QA officer has reviewed the test results and quality control data and has concluded that the data quality objectives given in the generic verification protocol and test/QA plan have been attained. EPA and APCT Center QA staff have conducted technical assessments of the test laboratory and of the data handling. These assessments confirm that the ETV tests were conducted in accordance with the EPA-approved test/QA plan.

This verification statement verifies the emissions characteristics of the *CCD15010 fuel formulation with HiTEC4121 additive* for the stated application. Extrapolation outside that range should be done with caution and an understanding of the scientific principles that control the performance of the technology. This verification focuses on emissions. Potential technology users may obtain other types of performance information from the manufacturer.

In accordance with the generic verification protocol, this verification statement is valid, commencing on the date below, indefinitely for application of the *CCD15010 fuel formulation with HiTEC4121 additive* within the range of applicability of the statement.

<i>Original signed by S. Gutierrez</i>	<i>5/16/07</i>	<i>Original signed by A. R. Trenholm</i>	<i>5/14/07</i>
Sally Gutierrez	Date	Andrew R. Trenholm	Date
Director		Director	
National Risk Management Research Laboratory		Air Pollution Control Technology Verification Center	
Office of Research and Development			
United States Environmental Protection Agency			